REMARKS

Claims 1, 3-15, and 17-23 are pending in the above-identified application. Claims 12, 14, 15, and 20 are currently-amended. Claim 16 is canceled, and claim 23 is newly-added. The specification and claims 14 and 15 are amended and claim 23 is added to address informalities. Claim 20 is amended to depend from a claim that is still pending.

According to page 2 of the Office Action, claims 1, 3, and 14-16 stand rejected under 35 U.S.C. § 103(a) as obvious over Ahonen (U.S. Patent No. 5,216,330) in view of Hashimoto et al. (U.S. Patent No. 4,870,284), and further in view of England et al. (U.S. Patent No. 5,969,366). Although claim 12 is not listed on page *2*, it is mentioned two times on page *3*. Thus, it appears that claim 12 is also intended to be rejected.

Applicants respectfully traverse this rejection.

First, regarding claims 1 and 3, claim 1 describes a beam source configured such that:

> ... the two electrodes on the downstream end are separated by a distance of 5 millimeters or greater.

Claim 3 depends from claim 1, so it also describes this characteristic by virtue of its dependency. The asserted prior art does not teach or suggest this feature.

The rejection relies on the Ahonen multi-apertured screen grid 260 and accelerator grid 262 to anticipate the two downstream electrodes recited in claim 1. (Office Action, page 3, top.) However, it is acknowledged in the Office Action that Ahonen does not teach the claimed separation of a distance of 5 millimeters or greater.

To support the rejection, England et al. is relied upon to suggest modifying the Ahonen ion beam gun to have its screen grid 260 and accelerator grid 262 separated by the distance recited in claim 1. As explained below, England et al. cannot suggest this feature.

Portions of the England et al. disclosure are cited on page 5 of the Office Action to show a prior art teaching of two electrodes being separated by a distance of 5 millimeters or greater. If the Ahonen ion beam gun were modified so that its screen grid 260 and accelerator grid 262 were separated by the same distance that the England et al. electrodes were separated, the modified Ahonen ion beam gun would have an electrode separation as described in the claim.

However, MPEP § 2143 requires that, to establish a *prima facie* case of obviousness, "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." The Office Action, page 5, presents the conclusion that modifying the Ahonen ion beam gun so that its downstream electrodes would have the claimed spacing would

> provide the desired beam focus, thereby providing an improved ion implanter capable of implanting ions at low energy.

This statement cannot suffice for the suggestion or motivation required under MPEP § 2143 for the following reasons:

The Office Action provides no corresponding explanation of why the Ahonen ion beam gun supposedly does not already provide the "desired beam focus,"[1] so there is no justification that the modified Ahonen ion beam gun would be an *improved* ion implanter. In applicants' own review of the England et al. disclosure, no suggestion is found to modify the Ahonen ion beam gun to have its screen grid 260 and accelerator grid 262 separated by at least 5 mm. That is, applicants do not find and the Office Action does not provide any reason from the asserted prior art documentation to think that separating the Ahonen screen grid 260 and accelerator grid 262

[1] Under 35 U.S.C. § 282, a patent is presumed valid, so, unless proven otherwise, so it presently must be presumed that the Ahonen ion beam gun already provides an appropriate beam focus.

by at least 5 mm would provide any improvement. Because no reason is provided in the Office Action, the obviousness rejection has not been justified.

Accordingly, for at least this reason, the rejection of claims 1 and 3 should be withdrawn.

Applicants present an additional reason to withdraw the rejection of claim 3: this claim further specifies that the two electrodes on the downstream end are separated by a distance of 10-30 mm. MPEP § 2143 also requires that, to establish a *prima facie* case of obviousness, the prior art or references when combined must teach or suggest *all* the claim limitations.

The Office Action states (page 5) that England et al. discloses a separation of less than 90 mm. However, this is not a specific disclosure of a separation of 10-30 mm as claimed. Applicants have independently studied the England et al. disclosure, and they find no teaching of two downstream electrodes being separated within the range recited in claim 3. For this additional reason, the rejection of claim 3 is improper. (Applicants also present this distinction as a reason to allow new claim 23.)

Regarding claims 12 and 14-16, claim 12 describes a neutral particle beam source such that:

> charge exchange takes place in said beam emitting holes formed in the downstream electrode, resulting in an emission of a neutral particle beam.

Because claims 14-16 depend from claim 12, they also describe a neutral particle beam source with this feature.

Ahonen does not disclose the above-quoted feature of claim 12, and the Office Action does not indicate any suggestion in either Hashimoto et al. or England et al. to modify the Ahonen ion beam gun to have this feature. In fact, the Office Action provides no statement at all to explain why a neutral particle beam source with this claim feature would supposedly have

been obvious. Therefore, the rejection of claims 12 and 14-16 has not been justified for at least this reason.

Additionally, claim 12 is now amended to specify that:

> each of the beam-emitting holes formed in the beam-emitting electrode on the downstream end has a length-to-diameter ratio of 2 or greater.

(Because claims 14-16 depend from claim 12, they also describe this feature by virtue of their dependency.) The asserted prior art does not teach or suggest a beam source with this feature.

As described in applicants' specification (*e.g.*, from page 13, line 15, to page 14, line 5), when the length-to-diameter ratio of the beam-emitting holes is 2 or greater, ion particles can convert to neutral particles. Ahonen does not teach that its accelerator grid 262 for accelerating ions (relied upon to teach the claimed beam-emitting electrode) neutralizes an ion beam to produce a neutral particle beam. In column 5, lines 31-44, discussing the diameters of the holes, there is no description as to the length-to-diameter ratio. Applicants find no discussion of a length-to-diameter ratio for neutralizing an accelerated ion beam. For at least this reason, the rejection of claims 12 and 14-16 based on Ahonen, Hashimoto et al., and England et al. should be withdrawn.

The Office Action provides a citation to Kinoshita et al. on page 7. In particular, the Office Action cites microchannel plate 34 and characterizes the plate as able to "produce neutral particles by charge exchange." However, microchannel plate 34 is not a beam-emitting electrode as claimed. Instead, it is a porous plate made of insulating material, such as shower nozzle type thin quartz comprising hollow glass fibers. (Column 11, lines 14-19). The text in column 12, lines 12-22, indicates that the microchannel holes 34A are provided for aligning particles that were already neutral before reaching the microchannel holes.

Applicants acknowledge that Kinoshita et al. also discloses an embodiment of microchannel plate 34 with a surface electrode 34B (column 16, lines 10-11) and another embodiment with surface electrode 34B and a second surface electrode 34C (column 16, lines 29-30). However, applicants find no teaching that either first surface electrode 34B or second surface electrode 34C has a length-to-diameter ratio of 2 or greater as claimed.

Because Kinoshita et al. does not teach a beam-emitting electrode on the downstream end having the claimed length-to-diameter ratio, a rejection based on Kinoshita et al. having such a teaching cannot be proper and should be withdrawn.

The Office Action on page 8 provides the following three reasons why Kinoshita et al. supposedly would have suggested modifying the Ahonen beam source to have the claimed length-to-diameter ratio:

1. the plasma would be contained and shaped within the chamber;
2. all ions exiting the emitting electrode would be incident to the surface of the sample; and
3. a neutral particle beam would be irradiated onto the sample surface.

These statements cannot suffice to justify the obviousness rejection. Regarding the first statement, there is no corresponding explanation in the Office Action of how the claimed length-to-diameter ratio of holes in accelerator grid 262 at the most downstream location of the beam source would affect the containment or the shape of the plasma *upstream* in the chamber 100. Regarding the second statement above, there is no corresponding explanation in the Office Action explaining why it would be proper to think that all ions[2] exiting the Ahonen emitting electrode were not already incident to the surface of the sample. Regarding the third statement,

[2] Applicants are claiming a *neutral* particle beam source, so the arguments in the Office Action must show how the modified Ahonen beam gun would provide neutral particles instead of ions.

applicants explain above that the Kinoshita et al. microchannel plate 34, which is not an electrode, does not produce neutral particles from ions.

For at least this additional reason, applicants submit that the asserted prior art does not render claims 12 and 14-16 obvious, so the rejection should be withdrawn.

Applicants present still another reason to withdraw the rejection of claim 15: this claim 15 specifies the configuration of the two electrodes on the downstream end being separated by a distance of 5 millimeters or greater. As discussed above with respect to claim 1, the asserted prior art does not render this configuration obvious. (See above for details.) For this additional reason, the rejection of claim 15 should be withdrawn.

Claims 5, 11, 13, and 22 stand rejected under 35 U.S.C. § 103(a) as obvious over Ahonen, Hashimoto et al., and England et al. in view of Savas (U.S. Patent No. 5,983,828), as discussed in the Office Action, beginning on page 5. Applicants respectfully traverse this rejection.

Claims 5, 11, 13, and 22 each depend from one of claims 1 and 12, and applicants explain above why the rejection of those claims is improper. Therefore, the rejection of claims 5, 11, 13, and 22 is improper for at least the reason of their dependency.

Applicants acknowledge that the rejection of claims 5, 11, 13, and 22 is based also on prior art that is not asserted to reject parent claims 1 and 12. However, the rejection of claims 5, 11, 13, and 22 is based on Ahonen, Hashimoto et al., and England et al. supposedly justifying the rejection of claims 1 and 12.

Accordingly, the obviousness rejection of claims 5, 11, 13, and 22 should be withdrawn.

Claims 4, 6, 7, 10, 12, 16-18, and 21 stand rejected under 35 U.S.C. § 103(a) as obvious over Ahonen, Hashimoto et al., and England et al. in view of Savas and further in view of

Kinoshita et al. Claim 16 is now canceled. Regarding the other claims, applicants respectfully traverse this rejection.

Above, applicants explain why the rejection of independent claims 1 and 12 is improper. Claims 4, 6, 7, and 10 depend from claim 1, and claim 17, 18, and 21 depend from claim 12. Therefore, the rejection of claims 4, 6, 7, 10, 17, 18, and 21 is improper for at least the reason of their dependency. Applicants acknowledge that the rejection of claims 4, 6, 7, 10, 12, 17, 18, and 21 is based also on prior art that is not asserted to reject independent claims 1 and 12 as addressed above. However, the present rejection is based on Ahonen, Hashimoto et al., and England et al., and apparently also on Kinoshita et al., justifying the rejection of claims 1 and 12.

Accordingly, the obviousness rejection of claims 4, 6, 7, 10, 12, 17, 18, and 21 should be withdrawn.

Claims 1-20 are rejected under 35 U.S.C. § 103(a) as obvious over Ahonen, Hashimoto et al., and England et al. in view of Savas and further in view of Kinoshita et al. and still further in view Sheehan, (U.S. Patent Application Pub. No. 2002/0011560). Claim 2 was already canceled on the date of the Office Action, and claim 16 is canceled with the present submission. Regarding claims 1, 3-15, and 17-20, applicants respectfully traverse the rejection.

Again, applicants explain above why the rejection of independent claims 1 and 12 is improper. Claims 3-11, 13-15, and 17-20 each depend from one of claims 1 and 12. Therefore, the rejection of claims 3-11, 13-15, and 17-20 is improper for at least the reason of their dependency. Applicants acknowledge that the rejection of claims 1, 3-15, and 17-20 is based also on prior art that is not asserted to reject claims 1 and 12 as addressed above. However, the present rejection is based on Ahonen, Hashimoto et al., and England et al., and apparently also on Kinoshita et al., justifying the rejection of claims 1 and 12.

Accordingly, the obviousness rejection of claims 1, 3-15, and 17-20 should be withdrawn.

In view of the remarks above, applicants now submit that the application is in condition for allowance. Accordingly, a Notice of Allowability is hereby requested. If for any reason it is believed that this application is not now in condition for allowance, the Examiner is invited to contact applicants' undersigned attorney at the telephone number indicated below to arrange for disposition of this case.

In the event that this paper is not timely filed, applicants petition for an appropriate extension of time. The fees for such an extension, or any other fees which may be due, may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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